

## PORTABLE CLEANING DEVICE

### BACKGROUND OF THE INVENTION

#### 1. Field of the Invention

The present invention relates generally to cleaning devices, and more specifically to a portable cleaning device.

#### 5 2. Background

Automobiles have long been, and continue to be, a critical component of our transportation system. As a result, a large percentage of people use automobiles as their main mode of transportation. Many automobile owners consider their automobile to be much more than a mode of transportation, and  
10 utilize their automobile as an expression of their personality. As such, many automobile owners prefer to maintain the appearance of their automobile in new or like-new condition. Further, in climates that experience inclement weather such as snow, sleet and rain, keeping an automobile clean takes on added importance due to the salt, sand and other chemicals used to maintain roads in  
15 these adverse weather conditions. In order to prevent corrosion, automobiles that are used in these conditions must be cleansed periodically.

Accordingly, there is a high demand for car care products for maintaining the appearance of automobiles. This has led to a plethora of car care products  
20 that are widely available including car waxes, car wash solutions, car wash sponges, car wash cloths and towels, car wash brushes, etc.

Unfortunately, cleaning automobiles using these products is a time consuming and labor intensive task. Also, cleaning an automobile during cold  
25 weather is extremely difficult and uncomfortable. Therefore, during the time of year when cleaning the automobile is most critical due to the risk of corrosion, automobile owners are less likely to clean their automobiles, thus leading to premature corrosion. Automatic car wash facilities are available. However,

because the automobile must be driven to these facilities, this presents an added inconvenience and time drain. Also, some of these facilities are expensive and use devices that scratch the surface of the automobile.

5           Therefore, there is a need for a device that can clean an automobile quickly and easily, even during cold weather, and that can be used at home without the need to travel to an automatic car wash facility, or another location.

          One type of car wash device is described in U.S. Patent Application  
10   Publication US 2002/0148907 A1. This reference discloses a portable spray car wash device that dispenses liquid cleaners and waxes for cleaning an automobile. However, the car wash device disclosed in this device does not use water. Therefore, this device cannot effectively wash an automobile.

15           U.S. Patent Application Publication US 2002/0117883 A1 discloses an industrial cleaner for cleaning sinks, toilets, shower stalls, locker rooms, etc. The disclosed cleaning device includes a brush 20 for scrubbing the surface to be cleaned, and a sprayer tube 18 connected to a spray gun 26 for spraying cleaner fluid and rinsing fluid on the object to be cleaned. Since the brush 20  
20   and sprayer gun 26 are separate, they must be operated independently, thereby making the cleaner difficult to use.

          U.S. Patent No. 6,145,711 discloses a portable garden sprayer for spraying liquids such as pesticides. The sprayer includes a wheeled frame 300,  
25   a detachable tank 100, and a power head 200 for pressurizing the tank 100. The disclosed device is only a sprayer and does not include any components for cleaning objects.

#### SUMMARY OF THE INVENTION

30           The present invention provides a portable cleaning device that effectively cleans automobiles, boats, motorcycles, outdoor furniture, driveways, patios, decks, swimming pools, houses, animals, etc. The cleaning device is easy to

use, lightweight, and economical. The cleaning device of the present invention is a completely self-contained device that can quickly and effectively clean automobiles and other objects anywhere, year round. No water hose or electrical cords are necessary. Further, the present invention is completely  
5 portable and can be transported without leakage. The cleaning device of the present invention can store enough water to effectively wash a normal car with less than three gallons of water. Washing a car using a standard hose can required over 15 gallons.

10 Features of the invention include a storage tank for storing a rinsing fluid, a pressurizer for pressurizing the rinsing fluid in the storage tank, a brush for scrubbing the object to be cleaned, and a sprayer contained within the brush for spraying the rinsing fluid from the storage tank onto the object to be cleaned. Other aspects of the invention aspects of the invention are  
15 disclosed *infra*.

#### BRIEF DESCRIPTION OF THE DRAWINGS

These and other features and advantages of the present invention will  
20 become more apparent in view of the following detailed description in conjunction with the accompanying drawing, of which:

FIG 1 is a schematic representation of a first embodiment of the present invention.

25 FIG 2 is a schematic representation of a second embodiment of the present invention.

FIGS. 3A – 3D show a clip for attaching the brush to the handle.

FIGS. 4A and 4B are a schematic representation of the brush of the present invention.

30 FIGS. 5A, 5B and 5C are schematic views of the sprayer of the present invention.

FIG. 6 is a schematic view of a tube attached to the valve for operating the brush of the present invention.

FIG. 7 is a schematic representation of the valve for operating the brush of the present invention.

5        FIG. 8 is a schematic view of the hose attached to the tank of the present invention.

#### DETAILED DESCRIPTION OF AN ILLUSTRATIVE EMBODIMENT

10        The present invention will be described herein with reference to an illustrative embodiment of a portable cleaning device.

The portable cleaning device according to the instant invention is schematically illustrated in FIG. 1 as reference numeral 10. The portable  
15        cleaning device 10 comprises, *inter alia*, a base frame 20, a storage tank 30 for storing a rinsing fluid such as water, disposed on the base frame 20, a pressurizer 40 for pressurizing the rinsing fluid stored in the storage tank 30, a brush 50 for scrubbing the object to be cleaned, and a hose 60 for supplying the  
20        rinsing fluid stored in the storage tank 30 to the brush 50. The hose 60 can be any flexible hose, for example a hose made of rubber, vinyl, etc. A rubber fuel line for an automobile with an inner diameter of 0.64 cm (0.25 inches) has been found to be sufficient. The hose 60 is of sufficient length (e.g. 3 m) to allow the brush to effectively reach the object to be cleaned.

25        The tank 30 includes a release valve for relieving the pressure in the tank, for example when the tank is opened for refilling. As shown in Fig. 1, the release valve comprises a vent lever 45. When the vent lever 45 is pulled in an upward direction, the pressure in the tank 30 is released. The activation of the vent lever 45 also can function to unlock the pressurizer 40, so that it can be  
30        removed by turning the pressurizer in a counter clockwise direction.

The pressurizer 40 can be a battery powered pump or a manual pump. In the case of a battery powered pump, the VersaPac® portable battery system manufactured by Black & Decker can be used. In the case of a manual pump, the hand-pump used with the PortaSpray multi-purpose sprayer 60-130 manufactured by Hudson can be used, as shown in Fig. 2.

As shown in Fig. 1, the base frame 20 is supported by 2 wheels 70 that are connected by an axle (not shown). A handle 80 attached to the base frame 20 extends vertically from the base frame 20. The handle 80 is used to tilt and move the portable cleaning device 10 in any direction on wheels 70. The handle 80 also can be used to lift the cleaning device. Also, a nylon lifting strap 85 can be placed in the lower end of the tank 30 adjacent to the wheels 70 to assist in lifting the cleaning device. The handle 80 includes a U-shaped end 90, as shown in Fig. 1, so that the user can easily manipulate the portable cleaning device 10. The end of the handle 80 can be shaped into additional configurations that promote the mobility of the cleaning device, such as Y-shape, T-shape, and J-shape, etc. A rubber or foam cover 100 is placed over the U-shaped end 90 to promote gripability, as shown in Fig. 1. Also, the handle 80 is retractable to further increase the compactability of the cleaning device.

As shown in Fig. 1, the handle 80 includes a clip 110 for clipping the brush 50 onto the handle 80. The clip 110 can be made from a standard broom holder clip, which can be mounted to the handle 80 with a riv nut. Such a standard broom holder includes two flexible, curved, plastic extensions that receive and lock the brush 50 therebetween when the brush 50 is inserted between the extensions. Figs. 3A and 3B show a standard clip and a modified clip, respectively. As shown in Fig. 3B, the clip includes a clearance hole through which a fastener can be placed in order to attach the clip 110 to the handle 80. Fig. 3C shows a side view of the modified clip of Fig. 3B. Fig. 3D shows the handle attached to the modified clip.

As shown in Fig. 1, a bottle holder 120 for holding a spray bottle 130 containing a cleaning solution is attached to the handle 80. The cleaning solution is chosen based upon the desired use of the cleaning device 10. For example, if the cleaning device 10 is being used to wash an automobile, then the spray bottle 130 can be filled with car wash solution. The bottle holder 120 can have any shape that effectively can hold a bottle or any other type of storage device. For example, the bottle holder 120 can be made from an automobile cup holder of the type that is mounted to the interior of the car door, for example, model number 91132F made by Custom Accessory Inc, (Niles, IL). This type of bottle holder is mounted to the car door by a U-shaped bracket that is inserted between the door window and the inside of the door of the automobile. When this type of bottle holder is used in the present invention, the end of the U-shaped bracket is removed and the bottle holder 120 is attached to the handle 80 with a riv nut. In addition, plastic tie wraps can be used to connect the bottle holder 120 to the handle 80.

A schematic view of the brush 50 is shown in Figs. 4A and 4B. As shown in Fig. 4A, the brush 50 includes a flat end portion 200 and handle extension 210 extending away from the flat end portion 200 in a direction parallel to the plane in which the flat end portion 200 extends. The handle extension 210 is used to hold and manipulate the brush 50. The handle extension 210 can be extendable to increase the length of the handle, thereby making it possible to clean hard-to-reach places. A foam or rubber cover 220 is placed over the handle extension 210 to promote gripability. Rubber tape used for bicycle handlebars has been found to work well, although other foam or rubber materials also can be used. To further promote gripability, a rope 230 can be wrapped around the handle extension 210 and disposed between the cover 220 and the handle extension 210. The brush 50 also includes bristles 240 for scrubbing the object to be cleaned. The bristles 240 extend in a direction perpendicular to the flat end portion 200. The bristles can be made of a material that effectively cleans objects without scratching, such as nylon, polystyrene or polyethylene, as in the brush TW-124 made by Turtle Wax.

A sprayer 250 is attached to the brush 50 for spraying the rinsing fluid from the storage tank 30 onto the object to be cleaned. As shown in Fig. 4, the sprayer 250 is disposed on top of the flat end portion 200. The sprayer 250 is strategically placed close to the end of the bristles 240 of the brush 50 so that the rinsing fluid can be effectively sprayed onto the object to be cleaned. Preferably, the sprayer 250 is positioned within 0.635 cm (0.25 inches) of the end of the brush 50.

As shown in Fig. 5A, the sprayer 250 includes an end cap 252 disposed at the end of the sprayer 250. Inside the sprayer 250 is an orifice 254. The flow rate and flow pattern of the sprayer 250 can be adjusted by rotating the end cap 252. The spray pattern of the sprayer 250 also can be changed by changing the configuration of the end of the sprayer 250, which connects to the end cap 252. For example, in Fig. 5A, the end of the sprayer includes a thru-hole 254. If the thru-hole 254 is changed to a cut-out portion, as shown in Fig. 5B, the spray pattern will change to a fan-shaped spray pattern. Fig. 5C shows an end view of the sprayer of Fig. 5B.

The sprayer 250 is attached to the hose 60 through a tube 260. As shown in Fig. 5A, the sprayer 250 is screwed over the tube 260. The tube 260 is a plastic tube having an outer diameter of approximately 1.02 cm (0.4 inches). The tube 260 is attached to the hose 60 through the valve 310 that controls the flow of rinsing fluid through the brush 50, as shown in Fig. 6. As shown in Fig. 6, the tube 260 is attached to the valve 310 through a screw-on flange. As the tube 260 is screwed onto the valve 310, an O-ring 262 compresses against an O-ring sealing surface 264. The connection of the tube 260 with the hose 60 is also shown in Fig. 7.

The activation of the sprayer 250 is controlled by a lever 300 that controls a valve 310, which turns on and off the flow of rinsing fluid from the storage tank 30 to the tube 260. The lever 300 controls the valve 310 by

pressing in a plunger 320, which allows the cleaning solution to flow through the valve 310, as shown in Fig. 7. The flow of cleaning solution through the valve 310 is proportional to the deflection of the plunger 320, whose position is controlled by the lever 300. Although Fig. 7 shows a variable flow valve 310, an  
5 incline directional check valve that simply toggles between flow and no flow also can be used. As shown in Fig. 7, the plunger 320 is attached to a spring 330, which controls the deflection of the plunger 320. The valve 310 is attached to the hose 60 through a threaded connection and a barb 340 to maintain the seal therebetween. A strain relief casing 350 is used for strain relief of the hose 60.

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As shown in Fig. 4, the foam or rubber cover 220 wrapped around the handle extension 210 functions to attach the tube 260 to the handle extension 210. Additionally, plastic tie wraps can be used to attach the tube 260 to the handle extension 210.

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Alternatively, the sprayer 250 can be disposed inside the brush 50. In this case, the brush 50 can be made of two molded portions and the sprayer 250 and tube 260 are disposed inside the brush 50 between the 2 molded portions. In this case, the two molded portions can be attached with screws or  
20 epoxy. Also, the tube 260 and sprayer 250 can be placed in a milled-out portion of the brush 50 and covered with epoxy. Alternatively, the tube 260 can be placed in a hole that extends through the brush 50.

As shown in Fig. 8, the tube 60 is connected to the tank 30 through a  
25 reducing barb union 400. The tube 60 is compressively fit to the tank 30 with O-rings 410. A pick-up tube 420 disposed in the tank is connected to the tube 60 through the reducing barb union 400.

As shown in Fig. 1, a thermo-electric heater 500 can be disposed in the  
30 bottom of the tank 30 to heat the rinsing fluid contained therein. A heated rinsing fluid will more effectively clean objects. In order to promote the portability and utility of the cleaning device, the heater can be powered by a



cigarette lighter receptacle. In this case, the heater 500 can be powered by a 12 volt/38 watt heater, which can be attached to the cigarette lighter receptacle through an adapter cord (not shown). Also, a bucket of rinsing water (not shown), or a towel (not shown) can be used to clean the bristles 240 of the  
5 brush 50 periodically while using the cleaning device.

The tank 30 is re-filled by releasing the vent lever 45, removing the tank from the base frame 20, and adding the rinsing fluid to the tank using a plastic funnel.

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Although the invention has been shown and described with respect to exemplary embodiments thereof, various other changes, additions and omissions in the form and detail thereof may be made therein without departing from the spirit and scope of the invention.

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